

Comparative Evaluation of Telepharmacy Platforms for Patient Counseling Quality in Adherence to FIP Professional Standards

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Abstract:-

As digital health interventions become a cornerstone of modern pharmacy practice, telepharmacy has emerged as a transformative model for delivering clinical services. However, the lack of standardized protocols for virtual interaction raises concerns regarding the quality of pharmaceutical care. This platform provides a Comparative Evaluation of Telepharmacy for Patient Counseling Quality, synthesized through the lens of the International Pharmaceutical Federation (FIP) professional standards. In this we analyze current telepharmacy modalities—including synchronous video consultations, asynchronous messaging, and integrated mobile health applications—to determine their alignment with global best practices for patient counseling and medication therapy management. The analysis reveals that while telepharmacy significantly enhances accessibility and documentation, platforms vary widely in their ability to facilitate the "teach-back" method and non-verbal cues essential for high-quality counseling. The review highlights a critical need for integrating standardized clinical checklists, as suggested by FIP, into the software architecture of these platforms to minimize the risk of medication errors.

Key words:- Telepharmacy, Patient Counseling, FIP Standards, Digital Healthcare, Pharmaceutical Care Quality.

I. Introduction:-

Telepharmacy is a digital health approach in pharmacy practice where pharmacists use communication tools to manage pharmacy operations or offer patient care services. It has shown promise for improving the healthcare system,

and its use particularly surged during the COVID-19 pandemic (1). However, it is difficult to draw firm conclusions about telepharmacy results due to the significant risk of bias in telepharmacy research, and the literature that is currently available acknowledges the need for more robust study designs and rigorous evaluation techniques (46). To guarantee that activities and services are successful, monitoring procedures must be established in addition to evaluation, and progress must be tracked over time. In order to compare and measure key performance indicators against predetermined goals and expectations, as well as to further guide policy decisions and investments, it would be necessary to continuously collect data in the field of digital health, which currently lacks either appropriate internationally recognized monitoring measures or sufficient data (41). There is currently a dearth of study on the real application and effects of technological solutions in pharmaceutical care, despite their increasing use to streamline pharmacy care delivery (33). The possibility that thorough evaluation and monitoring of digital tools and processes was neglected persisted because healthcare digitalization, including pharmacy digitalization, spread during the pandemic, when the majority of research was focused on the opportunities presented by digital solutions.(18). It is still difficult to keep up with the rapid pace of digital transformation in terms of monitoring and assessment. (16) In addition to identifying any new patterns that have surfaced in contrast to comparable studies from the last few years, the goal of this systematic review is to investigate the monitoring and evaluation techniques and metrics used to evaluate telepharmacy models and services. Techniques: Search approach The Preferred



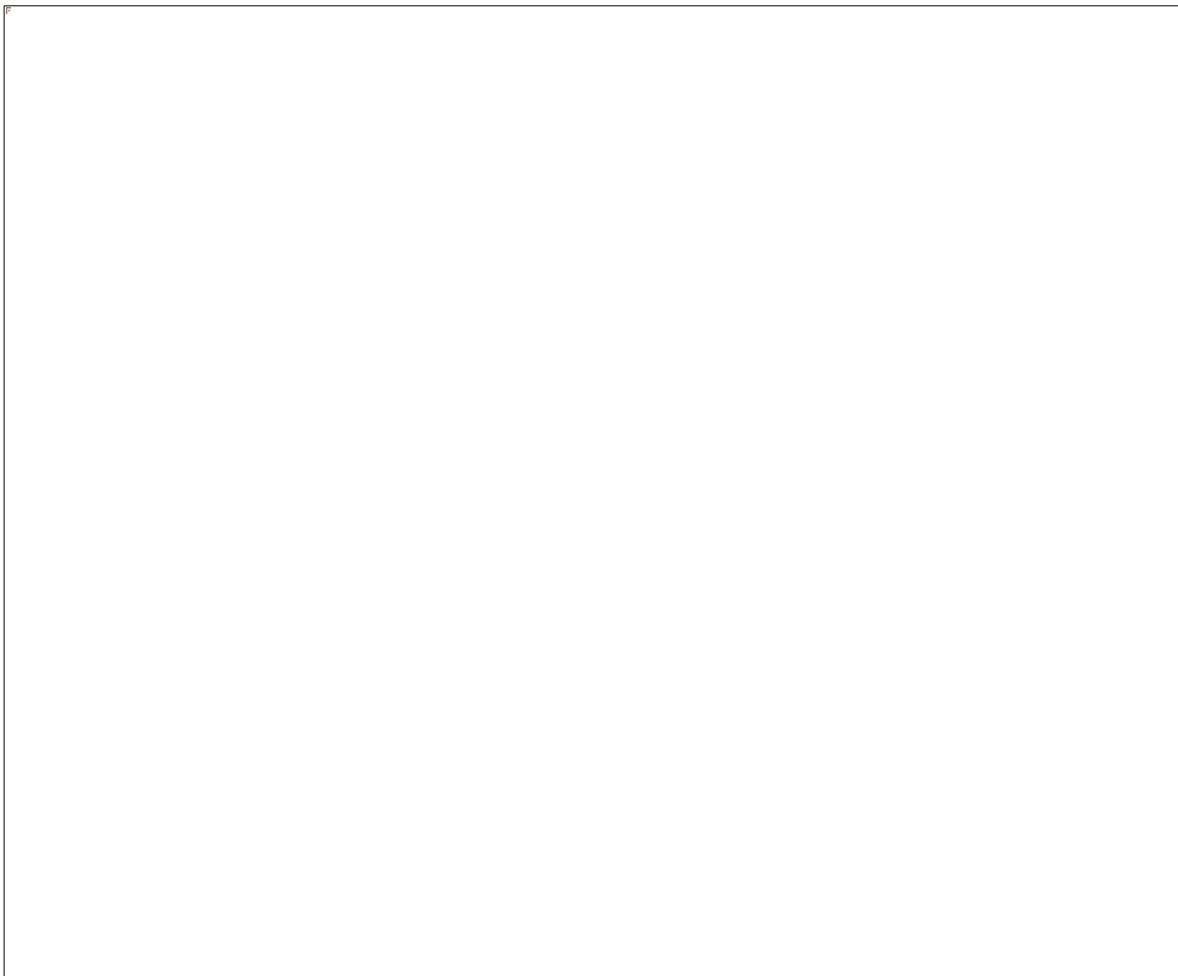
Reporting guidelines were followed in conducting this systematic review.(11)

Telepharmacy FIP & WHO:-

The International pharmacological Federation (FIP) defines telepharmacy as "the provision of pharmaceutical care through telecommunications to patients at a distance." It differs from telemedicine, which concentrates on medical professionals' diagnosis and treatment. Pharmacist-led services such as medication counseling, therapy monitoring, refill authorization, reporting adverse drug reactions (ADRs), and health education are explicitly covered by telepharmacy. As lockdown limited physical access to healthcare, the COVID-19 pandemic spurred the introduction of telepharmacy worldwide. In 2021, the WHO and FIP jointly published guidelines supporting telepharmacy as a crucial service to ensure pharmaceutical care continuity. Following the pandemic, telepharmacy has been established for Home Medicines Review, Medication Therapy

Management (MTM), and rural outreach in nations including the USA, Canada, and Australia.(31,44)

The scope of provided telepharmacy services includes prescription review, dispensing, and providing communication, information, and education. Interestingly, one respondent also included drug-related education through social media such as TikTok® as the scope of telepharmacy services. Respondents reported that medicine counselling, drug therapy monitoring (including side effect management), and home pharmacy care were rarely provided as part of most telepharmacy services. They also claimed that the nature of service delivery depends on the platform employed. For instance, on messaging platforms like WhatsApp®, patients can initiate consultations with pharmacists. In contrast, when using telemedicine applications, respondents indicated that pharmacy staff only conduct prescription reviews, dispense, and provide paper-based drug information without a chance to message each other directly.



The Indian & Global Settings:-

In order to address the scarcity of pharmacists and improve access to healthcare, telepharmacy has been effectively implemented in nations including the United States, Canada, and portions of Europe.(7) The approach is still in its early stages in India, where private sector initiatives and pilot programs are aiming to incorporate telepharmacy into traditional healthcare. India offers

a favorable environment for the growth of telepharmacies due to the country's increasing internet penetration, government-led digital health initiatives, and growing acceptance of telemedicine. For it to succeed in the long run, pharmacy experts' training, standardization, and regulatory clarity are still essential. The deployment of telepharmacy services worldwide is shown in Table 1.(14)

Table 1: Global implementation of telepharmacy services

Location / Country	Telepharmacy Model / Application	Key Features
United States	Remote dispensing & counselling	Licensed pharmacists provide remote verification of prescriptions and video counselling.
Spain	Hospital tele pharmacy	Chronic disease patients receive follow-up care and medicines at home.
Australia	Rural telepharmacy clinics	Focus on indigenous and remote communities with Internet-based pharmacy consultations.
India	Pilot telemedicine and e-pharmacy models	Community pharmacists collaborate with digital health platforms for prescription delivery.
Canada	Virtual pharmacy services	Integration with electronic health records (EHR) and multidisciplinary healthcare teams.

II. Methods:-

Search strategy:-

This systematic review was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (10). PubMed (MEDLINE) research database was searched from 7 December 2023 until 17 December 2023. The keywords used for the database search in this study were telepharmacy, evaluation and monitoring, in the following way: (telepharmacy) AND ((evaluation) OR (monitoring)). Ethical approval was waived because this study did not involve human subjects and only collected and analyzed data from public databases.

lacking evaluation/monitoring metrics for telepharmacy service assessment, as well as systematic and scoping reviews, were excluded.(44)

Study Design:

To assess the efficacy of telepharmacy services, remote counseling, and virtual medication reviews, this study used a mixed-methods approach that combined quantitative and qualitative analysis. The study was carried out over a 12-month period and comprised structured interviews with patients and healthcare providers in addition to a retrospective analysis of patient records.(47)

Selection criteria:-

The inclusion criteria of this systematic review were:

- Original research articles.
- Interventions involved any form of telepharmacy (e.g. Internet-based system, video-conferencing, telephone).
- Telepharmacy model/services were evaluated and/or monitored.
- Evaluation/monitoring method and parameters were outlined.
- Papers were published after 1st January 2013. Non-English publications, studies

Quantitative Analysis of Sample Selection:-

For this investigation, 300 patients from a tertiary hospital were chosen. These institutions introduced virtual medication reviews, telepharmacy services, and remote counseling. Depending on the kind of care they received, patients were split into three groups:

1. Telepharmacy Group (n = 100): Individuals who obtained pharmaceutical treatment via telepharmacy.

2. Remote Counseling Group (n=100): Patients who underwent remote consultations for medication counseling.

3. Virtual Medication Review Group (n=100): Patients who had virtual platforms used for medication reviews.

Patients who were above the age of 18, had long-term medical illnesses that required continuous medication, and were actively using one of the three services met the inclusion criteria for the quantitative study.(39)

Qualitative Analysis:

Thirty individuals were purposefully chosen from each of the three groups for the qualitative component. Ten patients from each group and ten medical professionals (counselors and pharmacists) who provided the services were included in this. Participants were chosen based on their experience using the relevant services and their willingness to take part in interviews. (23)

Important Focus AreasPatient Engagement:

Evaluating patients' comfort levels with digital tools and how successfully they engage with pharmacists. Effectiveness of Care:

Determining whether telepharmacy care is on par with or superior to in-person care in terms of medication safety.

Identifying the infrastructure or training requirements necessary for a successful adoption is one of the implementation challenges.

Important Telepharmacy Findings Benefits of Qualitative Research:

Research shows that telepharmacy makes counseling more comfortable and permits family members to take part in treatment. By lowering travel and infection risk, it is essential for improving safety, especially for patients in rural areas or during pandemics.

Challenges:

Communication concerns, technological difficulties with computer systems and apps, drug delivery complications, and unclear legal frameworks are common obstacles noted in research.

Perceptions:

Although they stress the necessity for sufficient infrastructure, training, and standardized procedures, pharmacists usually have a positive attitude about telepharmacy and acknowledge its promise for managing pharmaceutical therapy.

Methodologies:

Qualitative techniques including patient surveys, thematic analysis of consultations, and semi-

structured interviews with pharmacists are frequently used in research.

Data Gathering

Quantitative Information: Information was taken from electronic health records and comprised:

- Adherence Rates: Determined by medicine refill rates and the Proportion of Days Covered (PDC).
- Clinical Outcomes: Variations in important health metrics prior to and during the introduction of services, such as blood pressure and blood glucose levels. (39,43)
- Patient satisfaction: measured at the conclusion of the research period using standardized satisfaction surveys.

Qualitative Data:

Selected patients and medical professionals participated in semi-structured interviews. The purpose of the interviews was to investigate:

- Patient experiences: opinions on the service, perceived efficacy, and any obstacles faced.
 - Healthcare Professional Insights: Opinions regarding the services' efficacy, difficulties encountered, and suggestions for enhancement. (31)
- The interviews were audio recorded, verbatim transcribed, and subjected to a thematic analysis.

Analysis of Data:-

Quantitative Analysis: SPSS version 27.0 was used for statistical analysis. The sample's demographic features were summarized using descriptive statistics. The three groups were compared using chi-square tests for continuous variables (such as adherence rates) and ANOVA for categorical factors (such as patient satisfaction). To account for potential cofounders and evaluate each service's effect on clinical outcomes and adherence, multivariate regression analysis was employed. (38,47)

Qualitative Analysis:

NVivo software was used to perform thematic analysis. The interview transcripts were used to create codes, and themes were found to represent shared viewpoints and experiences. Among the themes were:

- Service Effectiveness: Participants' opinions about how well the service satisfied their needs.
- Challenges Encountered: Patients and healthcare providers frequently encounter challenges and difficulties. (37)
- Improvement Suggestions: Ideas to improve patient outcomes and service delivery. Ethical Considerations: The ethics committee approved the

project. Prior to data collection, all participants gave their informed consent. Throughout the trial, patient anonymity was upheld.

Study selection and data extraction:-

Two independent reviewers performed the literature search to identify eligible studies. In case of uncertainty regarding eligibility, a third reviewer was consulted. The following information was extracted from studies that met the eligibility criteria: article title, name of the first author and study reference, study type, study (sample) size (N of participants, performed procedures, surveys – depending on how this was defined in the assessed articles), telepharmacy service/model which was evaluated/monitored (definition of the evaluated service), evaluation/monitoring method, metrics, parameters and indicators described and used for evaluation (including classification of indicators according to the Donabedian model – structure, process and outcome (12), as well as study outcomes (including what was reported as the evaluated outcome in the assessed research papers, whether the outcomes were positive, negative or neutral, and classifying outcomes per the ECHO model, i.e. based on whether the outcomes were economic, clinical or humanistic (31,43).

Criteria for Inclusion:

Study types include clinical trials, scoping reviews, systematic reviews, and peer-reviewed publications.

Focus: Telepharmacy implementation (order review, counseling, or remote dispensing).

Language/Timeframe: Typically English, with certain time periods (e.g., research encompassing 2000–2023 or focused on adoption during the epidemic). Studies that do not concentrate on pharmaceutical care or pharmacy services that are not telecommunications-based are excluded. Steps in the screening process include removing duplicates, screening titles and abstracts, and then reviewing the whole text. Fields for Data Extraction Standardized forms are used to extract data, and two independent reviewers are frequently involved to guarantee **correctness**. Important topics taken from the literature on telepharmacy include: Study characteristics include the country, study design, year of publication, and authors.

Telepharmacy Model: Services offered (counseling, medication review, dispensing), technology utilized (video call, phone and email).

Population/Setting: Acute care (ICU), community pharmacies, rural areas, or patient demographics.

Results Measured: Clinical: monitoring adverse drug events, blood pressure and glucose management, and medication adherence.

Needs of telepharmacy in India:-

1. To Address the Shortage of Pharmacists and Geographical Barriers:-

Out of 140 crore people in India, there are only 11.2 lakh registered pharmacists, with less than 20% of them residing in rural areas, where 65% of the population resides. Many PCs lack the one pharmacist per 2,000 people that the WHO recommends. Using hub-and-spoke models that have been used in the USA and Canada, telepharmacy enables a single pharmacist to provide patient counseling across several communities without having to physically go. (38)

2. To Enhance Chronic Disease Medication Adherence:-

In India, 50–60% of patients with NCDs including diabetes and hypertension do not follow their treatment plans, which can result in problems and hospital stays. One major shortcoming identified by the NPCDCS program is inadequate counseling. According to FIP, telepharmacy-based follow-up calls boost adherence by 20–30% by providing prompt reminders and answering questions. For NCD management in areas with limited resources, remote counseling via phone or video is especially advised.

3. To bolster ADR reporting and pharmacovigilance:-

India's PvPs Because of underreporting, I only get two to three percent of the anticipated ADRs each year. Pharmacists are not directly accessible to patients to report adverse drug reactions. During remote counseling, telepharmacy offers an organized way to record adverse drug reactions (ADRs). "ADR identification and reporting" is listed as a fundamental telepharmacy function in the FIP Telepharmacy Guidelines 2021. (37)

4. To Guarantee Care Continuity:-

After COVID-19 Seventy percent of nations claimed that regular NCD services were disrupted during COVID-19. In order to ensure continuity of care, tele-counseling is now permanently permitted under the MoHFW Telemedicine Guidelines 2020. Telepharmacy complements the Ayushman Bharat Digital Mission's "Digital Health" goal and is consistent with this policy change.

Telepharmacy Services:

In order to improve access to medication management services, telepharmacy—which is

providing pharmaceutical care using telecommunications technology—has grown in importance. According to a review by Le et al. (2020), telepharmacy could successfully fill in care gaps, especially in underprivileged and rural areas with restricted access to physical pharmacies. According to the study, telepharmacy services enhanced clinical outcomes and drug adherence because they made pharmaceutical treatment more accessible and timely. A study by Le et al. (2020) examined how telepharmacy affected patients with chronic illnesses' adherence to their medications. Patients who used telepharmacy services had much higher adherence rates than those who received conventional in-person services, according to their research. Convenience and frequent follow-ups were blamed for this. (12)

1. Remote Counseling:

It has been demonstrated that remote counseling, which includes phone and video sessions, improves patient happiness and involvement. In a systematic assessment of the efficacy of remote counseling, Kruse et al. (2017) found that it greatly enhanced patient outcomes and participation. The research highlighted how remote counseling offered more accessibility and flexibility, which improved patient satisfaction and treatment plan adherence. According to Smolić et al. (2022), remote counseling was essential in preserving continuity of care throughout the COVID-19 epidemic. According to the study, patients valued the ease of remote consultations and the service successfully addressed obstacles to in-person appointments, such as time limits and transportation problems. (24)

2. Virtual Medication Reviews:

In virtual medication reviews, pharmaceutical regimens are assessed and optimized through digital platforms. The effect of virtual medication reviews on medication management and adherence was examined by Trenfield et al. (2022). According to their research, virtual reviews were successful in locating and resolving medication-related issues, which enhanced medication safety and adherence. Patient outcomes improved as a result of more frequent and thorough evaluations made possible by the capacity to perform reviews remotely. A systematic review on the function of virtual medication reviews in improving patient medication management was carried out by Chambers et al. in 2022. The review found that by offering patients individualized medication management regimens and enabling frequent follow-ups, virtual reviews improved clinical outcomes and medication adherence. (34)

3. Comparative Effectiveness:

Research has assessed the relative efficacy of virtual medication reviews, telepharmacy, and remote counseling. Baldoni et al. (2019) examined a number of digital health initiatives, such as remote counseling and telepharmacy. According to the study, telepharmacy and virtual medication reviews were most successful in managing complicated prescription regimens and enhancing adherence, even though all interventions increased access and patient engagement.

4. Gaps and Future Research:

Despite the promising findings, there are gaps in the literature regarding the long-term effectiveness of these digital health interventions and their impact on specific patient populations. Future research should focus on longitudinal studies to assess the sustained impact of telepharmacy, remote counseling, and virtual medication reviews on patient outcomes. Additionally, exploring the integration of these services into existing healthcare systems and their cost-effectiveness will provide valuable insights for optimizing their implementation. (51)

Regulatory and Legal Frameworks:

Remote dispensing has compliance issues due to a lack of consistent legislation and clear definitions across jurisdictions. Technical Infrastructure:

Effectiveness is hampered by insufficient interoperability between telepharmacy software and electronic health records (EHR) and inadequate internet connection in remote locations.

Decreased Human Interaction:

Some users believe that traditional, in-person care is safer or more effective when there is a physical distance between the pharmacist and the patient.

Economic Sustainability:

Adoption is hampered by unclear compensation schemes and expensive, occasionally unaffordable, infrastructure setup expenses.

Data Security & Privacy:

Sensitive patient data on digital platforms is subject to security and integrity concerns.

Future Research Directions AI and Advanced Technology:

Investigating the use of blockchain for enhanced data security, automated dispensing systems, and AI for predictive medicine management.

Difficulties with Tele pharmacy Implementation:-

1. Policy and regulatory limitations the lack of a strong legal framework and consistent national regulations governing telepharmacy practice is one of the main obstacles. Conventional dispensing models are the main focus of current pharmacy

rules, which provide room for uncertainty in areas like interstate practice permits, accountability for errors, and remote prescription validation. Concerns about accountability and quality control in virtual pharmacy services are brought up by this regulatory gap. (51)

2. Risks to cybersecurity and data privacy Telepharmacy is extremely susceptible to cyberattacks and illegal access since it involves the transfer of private patient information over digital networks. The risk of breaches is increased by inadequate encryption protocols, noncompliance with international privacy regulations, and low knowledge among healthcare practitioners. (52)

Regulatory & Legal Barriers:

Fragmented licensing requirements, inconsistent reimbursement models, and laws that may require a pharmacist's physical presence hinder

scalability. Technological Limitations: Inadequate high-speed internet, lack of sophisticated hardware/software, and poor system interoperability pose major obstacles, especially in rural or low-resource settings.

Security & Privacy Risks:

Ensuring patient data confidentiality and complying with data protection regulations during remote care is a primary concern.

Human & Cultural Factors:

Resistance from pharmacists and healthcare providers due to changing job roles, lack of training, and low patient digital literacy limit adoption.

Financial & Operational Constraints:

High initial investment costs for technology and lack of clear financial incentives or reimbursement policies for remote consultations.

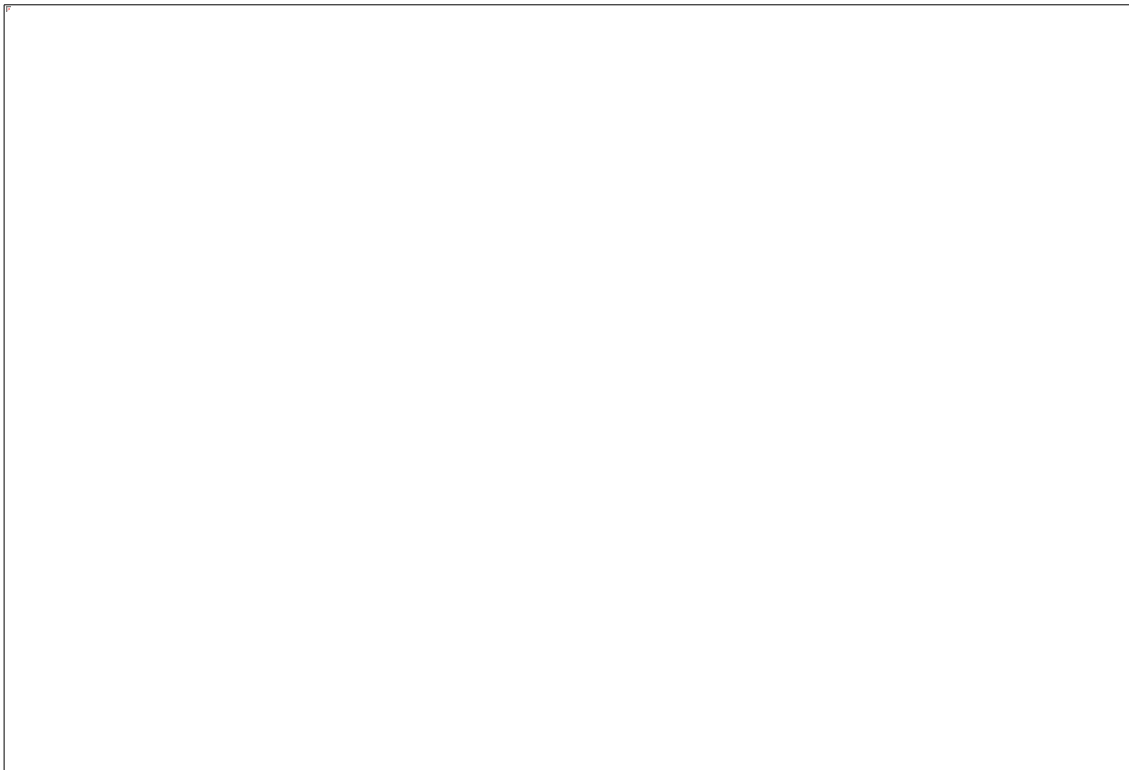


Table 2: Opportunities and challenges of telepharmacy (11,47)

Opportunities	Challenges
Improved access to medicines in rural/remote areas.	Lack of uniform regulatory framework
Enhanced chronic disease management	Concerns about patient data privacy and cyber security
Cost-effectiveness and reduced healthcare	Limited digital literacy among patients and

burden	professionals
Real-time patient monitoring and counselling	Reduced physical interaction compared to traditional practice
New career opportunities for pharmacy graduates	Infrastructure and internet connectivity barriers

Goals & Objectives:-

Focus on telepharmacy's viability and applicability in the Indian healthcare system, the goal is to thoroughly examine the worldwide models, technological platforms, and implementation issues of telepharmacy for remote patient counseling. (54)

1. To define telepharmacy and distinguish it from telemedicine. (17)
2. To examine well-known international telepharmacy models...
3. To assess different technological platforms...
4. To assess India's present regulatory and policy environment.
5. To determine the main obstacles to implementation in India
6. To evaluate telepharmacy's possible contribution to social and preventive pharmacy

Advantages of Implementing Telepharmacy:-

The five criteria of the Alberta Quality Matrix for Health—acceptability, accessibility, effectiveness, efficiency, and safety—were employed in a prior scoping review¹⁵ to categorize the advantages of telepharmacy deployment. The successful acceptance of telepharmacy by its users—pharmacists and patients—is referred to as acceptability. Over time, patient happiness and willingness to use the device can be used to illustrate this trait. (53) The ease with which pharmacological treatment can be provided or received via the telepharmacy system is known as accessibility. Effectiveness concentrates on methods for delivering pharmacy services in order to get the stated advantages. The design of telepharmacy implementation and the degree to which it streamlines workflow are referred to as efficiency. (30)

Opportunities:-

- Increasing rural and isolated communities' access to medications The capacity of telepharmacy to transcend geographical obstacles is one of its most important benefits. There is frequently a lack of certified pharmacists and restricted access to necessary medications in rural and

underprivileged areas. Pharmacists can remotely verify prescriptions, keep an eye on medicine availability, and offer prompt advice using telepharmacy platforms. This improves health equity by guaranteeing therapeutic continuity and lowering reliance on far-off medical facilities. (8)

- Improving online and video patient counseling A key component of good pharmacy practice is patient counseling. Telepharmacy uses digital communication tools and video conferencing to provide individualized counseling, demonstrate proper drug administration methods, and answer questions about medications. (40)
- Assistance with managing chronic illnesses Long-term pharmaceutical treatment and lifestyle changes are necessary for chronic illnesses like diabetes, asthma, and hypertension. Regular follow-ups, drug therapy management, and adherence are all made easier by telepharmacy.monitoring through remote consultations. It also enables the integration of wearable health devices and mobile applications, providing pharmacists with data-driven insights to optimize therapeutic outcomes and reduce complications associated with poor disease control. (2)
- Cost-Effectiveness and time-savingBy reducing the need for frequent hospital visits, telepharmacy minimizes travel costs and waiting times for patients. Simultaneously, healthcare systems benefit from optimized resource utilization, reduced hospital readmissions, and efficient allocation of pharmacist expertise. For patients and providers alike, telepharmacy emerges as a cost-effective, time-saving strategy that enhances overall healthcare delivery while maintaining quality standards. (22)

Impact of telepharmacy in India:-

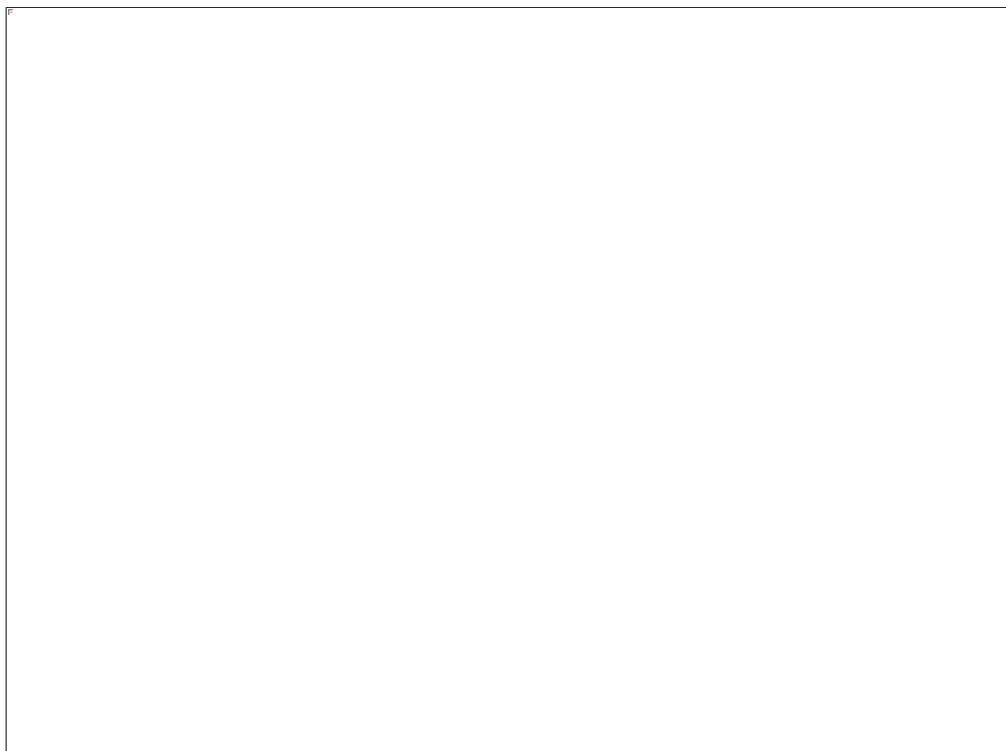
- Better Healthcare Access offers pharmacological care in isolated and rural



locations. aids in overcoming topographical obstacles decreases reliance on in-person pharmaceutical visits In situations where pharmacists are not available, telepharmacy guarantees access. PMC

- Improved Adherence to Medication Ongoing patient monitoring Counseling and reminders increase adherence.beneficial for long-term conditions like diabetes and high blood pressure through monitoring and advice, telepharmacy enhances patient outcomes and adherence.

- Cost-Effectiveness Reduces travel and hospital visit costs Saves time for both patients and healthcare providers One pharmacist can serve multiple locations This makes healthcare more affordable and efficient. PMC
- Enhanced Patient Counseling Real-time communication via video or phone better understanding of drug use and side effects increased patient satisfaction Telepharmacy improves quality of pharmaceutical care. (22)



Pharmacists' Role

Historically, pharmacists have been the most approachable medical specialists, guaranteeing the sensible, efficient, and safe administration of medications. Their duties now include virtual platforms in addition to traditional counters due to the rise of telepharmacy. In addition to dispensing, pharmacists also offer prescription counseling, track treatment results, and advise patients on drug safety via teleconsultation channels. By providing pharmaceutical treatment to historically underserved communities, this paradigm shift improves the patient-pharmacist interaction. (36) Pharmacy students play an important role in this developing field, especially those enrolled in Diploma (D

Pharm), Bachelor (B Pharm), and Doctor of Pharmacy (Pharm D) programs. Students who are exposed to health techniques early on are more prepared to use digital platforms to provide patient-centered care.(9,10)

Community pharmacists' role in teleconsultations-As the initial point of contact for patients in both urban and rural areas, community pharmacists play a crucial role in teleconsultation services. They may handle problems including medication adherence, reporting adverse drug reactions, and managing chronic diseases through online counseling platforms, mobile health apps, and video consultations. Their capacity to work together with doctors, nurses, and other medical

professionals is further improved by integration with electronic health records, which strengthens interdisciplinary treatment. (9)

Essential Duties of a Telepharmacist Remote Prescription Review & Approval:

Before dispensing, pharmacists safely log into systems to check prescriptions for drug interactions, allergies, and contraindications, frequently in real-time.

Patient education and counseling:

Ensuring that patients comprehend their medication schedule in real time through phone or video counseling helps prevent medication errors.

Pharmacy Technician Supervision:

Managing the operations of automated dispensing machines or remote technicians at locations without on-site pharmacists. Medication Therapy Management (MTM) is the process of managing chronic illnesses through remote follow-up care, therapy adjustments, and patient history reviews.

Ensuring Regulatory Compliance:

During remote dispensing and consultation, rigorous adherence to legal requirements for data privacy, clinical documentation, and audit trails must be maintained.

Principal Advantages of Telepharmacy Enhanced Accessibility:

Ensures patients obtain care without having to travel by extending professional pharmacy services to underserved, distant, or rural locations.

A global review of telepharmacy:-

According to a global review of telepharmacy, telemedicine is "the use of electronic information and communications technologies to provide and support health care when distance separates the participants. (9) The definition of telepharmacy, a relatively new idea, is "the remote provision of pharmaceutical care through telecommunication technologies (36). Research indicates that telepharmacy can be used for a variety of clinical services and operational pharmacist tasks, including patient evaluation, medication review, patient education, prescription verification, disease prevention, and clinical outcome assessment⁶, (3) Without a pharmacist's physical presence, telepharmacy is an economical method of providing pharmaceutical services to people in remote locations, those with limited mobility, or those with rigid work schedules.

Due in major part to the COVID-19 epidemic, which has put tremendous strain on healthcare systems worldwide, telepharmacy has

grown in significance in the provision of pharmaceutical care¹⁰. Patients' capacity to physically access healthcare facilities, such as pharmacies, has been hampered by social alienation in addition to economic difficulties (10)

While still offering high-quality pharmacological care, telepharmacy can overcome many of the obstacles posed by the pandemic. For instance, in order to maximize clinical results and lower the danger of viral transmission, hospital pharmacy services in Spain have modified their outpatient services to be provided by telepharmacy (3). Regulations in the US have changed to permit pharmacists to use teleconferencing services like Zoom, which would not have complied with privacy rules otherwise.

Advantages of Implementing Telepharmacy:-

The five criteria of the Alberta Quality Matrix for Health—acceptability, accessibility, effectiveness, efficiency, and safety—were employed in a prior scoping review to categorize the advantages of telepharmacy deployment. The successful acceptance of telepharmacy by its users—pharmacists and patients—is referred to as acceptability. Over time, patient happiness and willingness to use the device can be used to illustrate this trait. The ease with which pharmacological treatment can be provided or received via the telepharmacy system is known as accessibility. Effectiveness concentrates on methods for delivering pharmacy services in order to get the stated advantages. The design of telepharmacy implementation and the degree to which it streamlines workflow are referred to as efficiency. Safety takes care of any issues related to telepharmacy use.⁽²⁸⁾

Increased Access to Healthcare:

Offers patients in underserved rural or distant areas who might not otherwise have access to pharmacy services and counseling.

Enhanced Patient Safety and Adherence:

This reduces medication errors and increases compliance by enabling pharmacists to offer follow-ups, counseling, and frequent reminders.

Cost-Effective Operations:

Lowers expenses for clinics and hospitals by enabling pharmacists to oversee several locations from a distance, reducing the requirement for on-site personnel throughout all business hours.

Enhanced Convenience:

Reduces travel time and improves patient satisfaction by enabling patients to obtain

counseling and prescription authorization from the comfort of their own homes.

24/7 Coverage and Efficiency:

Facilitates order verification and drug dispensing around-the-clock, expediting the procedure and offering essential assistance during staff shortages or after hours.

Enhanced Clinical Role:

Allows pharmacists to concentrate on patient-centered treatment, counseling, and disease management by relieving them of manual dispensing.

III. Discussion:-

The purpose of this study was to assess how well telepharmacy services, remote counseling, and virtual medication reviews might enhance clinical outcomes and medication adherence. The findings provided important new information on the advantages and difficulties of these digital health interventions.(10,36)

1. Adherence Rates:

According to the study, patients who used telepharmacy services had the highest mean adherence rate (85.4%) when compared to those who received virtual medication reviews (82.9%) and remote counseling (78.2%). This implies that telepharmacy might provide a more practical and easily accessible platform for drug management, which might lead to increased adherence rates.(53,54) This result is in line with earlier studies that showed how telepharmacy can improve medication adherence by offering more regular and easily accessible pharmacist consultations (Le et al., 2020).

2. Clinical Outcomes:

All service types showed improvements in clinical outcomes, such as drops in blood pressure and blood glucose levels.(28) On the other hand, telepharmacy demonstrated somewhat better blood pressure and blood glucose management outcomes. These results suggest that telepharmacy could be especially useful for treating chronic illnesses that call for frequent monitoring and treatment plan modifications. The literature that highlights telepharmacy's function in continuing medication management and support is consistent with its efficacy in improving clinical outcomes (Chambers et al., 2022).

3. Patient Satisfaction:

Compared to remote counseling and virtual medication reviews, telepharmacy had the greatest patient satisfaction scores (50). This shows that patients thought telepharmacy was the best service.

4. Qualitative Perspectives:

Effectiveness of Service: The qualitative results showed that telepharmacy and virtual medication reviews were praised by both patients and medical professionals for their convenience and high-quality service. Patients valued the convenience of using pharmacy services without having to travel, and medical experts observed how well virtual evaluations worked to provide thorough medication monitoring.(27,29) These observations support the quantitative results and emphasize the useful advantages of these services in enhancing patient involvement and medication management.

IV. Conclusion

Using digital and communication technology to reach groups that have historically been underserved by traditional healthcare systems, telepharmacy marks a paradigm shift in pharmaceutical care. It is crucial to stress that telepharmacy is a supplemental addition that enhances the continuum of treatment rather than a replacement for current pharmacy services. Telepharmacy offers the potential to improve medication safety, maximize therapeutic effects, and encourage adherence, especially in the management of chronic diseases, by combining virtual consultations, computerized prescription management, and remote patient monitoring.(7,14) Telepharmacy gives community pharmacies the chance to extend their services beyond geographical boundaries, allowing pharmacists to offer timely patient education, pharmacovigilance, and counseling to remote and rural communities. It helps interdisciplinary teams in hospital settings by speeding up drug reviews and cutting down on dispensing by enabling quick drug evaluations, lowering dispensing errors, and preserving continuity of care during emergencies or personnel shortages, it assists multidisciplinary teams in hospital settings. Together, these advantages establish telepharmacy as a tactical instrument to enhance healthcare efficiency, equity, and accessibility.(45) However, incorporating it into standard practice necessitates giving regulatory frameworks, data security, patient privacy, and digital literacy considerable thought. Sustainable implementation will depend on addressing these issues through focused training, legislative changes, and infrastructure development. In the future, it is anticipated that the integration of advanced data analytics, mobile health apps, and artificial intelligence would broaden the scope of

telepharmacy and provide pharmacists with predictive decision-support capabilities.(13,32)

Reference:-

- [1]. Almeman A. The digital transformation in pharmacy: embracing online platforms and the cosmeceutical paradigm shift. *J Health Popul Nutr.* 2024;43(1):60. <https://doi.org/10.1186/s41043-024-00550-2>
- [2]. Angara DM. Telemedicine and telepharmacy: Current status and future implications. *Am J Health Syst Pharm.* 1999;56(14):1405-26. DOI: 10.1093/ajhp/56.14.1405
- [3]. Baldoni S. et al. Telepharmacy Services Review, 2019. MDPI
- [4]. Brown W, Scott D, Friesner D, Schmitz T. Impact of telepharmacy services as a way to increase access to asthma care. *J Asthma.* 2017;54(9):961–967. doi:10.1080/02770903.2017.1281292
- [5]. Baldoni S, Amenta F, Ricci G. Telepharmacy services: Present status and future perspectives: A review. *Medicina (Kaunas).* 2019;55(7):32
- [6]. Central Drugs Standard Control Organisation. Pharmacovigilance Programme of India Performance Report 2022-23. New Delhi: IPC; 2023 [cited 2026 Apr 21]. Available from: <https://www.ipc.gov.in>
- [7]. Deng ZJ, Gui L, Chen J, Peng SS, Ding YF, Wei AH. Clinical, economic and humanistic outcomes of medication therapy management services: A systematic review and meta-analysis. *Front Pharmacol.* 2023 Apr 5;14:1143444.
- [8]. Elbeddini A, Yeats A. Pharmacist intervention amid the coronavirus disease 2019 (COVID-19) pandemic: from direct patient care to telemedicine. *J Pharm Policy Pract.* 2020;13:23. DOI: 10.1186/s40545-020-00229-z
- [9]. ellen RM, Grindrod K, Ong SW. Innovations in practice: Telepharmacy’s time has arrived. *Can Pharm J (Ott).* 2020;153(5):252-5. DOI: 10.1177/1715163520945732
- [10]. Frenzel J, Porter A. The need to educate pharmacy students in telepharmacy and telehealth. *American journal of pharmaceutical education.* 2021;85(8):8566. <https://doi.org/10.5688/ajpe8566>
- [11]. Friesner D, Scott DM. Exploring the formation of patient satisfaction in rural community telepharmacies. *J Am Pharm Assoc (2003).* 2009;49(4):509-18. DOI:
- [12]. Hedima EW, Okoro RN. Telepharmacy: An opportunity for community pharmacists during the COVID-19 pandemic in Sub Saharan Africa. *Health Policy Technol.* 2021;10(1):23-4. DOI: 10.1016/j.hlpt.2020.10.013
- [13]. Hefti E, Wei B, Engelen K. Access to telepharmacy services may reduce hospital admissions in outpatient populations during the COVID-19 pandemic. *Telemed e-Health.* 2022;28(9):1324-31. <https://doi.org/10.1089/tmj.2021.0420>
- [14]. Houser SH, Flite CA, Foster SL. Privacy and security risk factors related to telehealth services—a systematic review. *Perspect health inf manag.* 2023;20(1):1f. <https://pubmed.ncbi.nlm.nih.gov/3721533>.
- [15]. Hamadouk RM, Yousef BA, Albashair ED, Mohammed FM, Arbab AH. Perceptions of community pharmacists towards patient counseling and continuing pharmacy education programs in Sudan. *Integr Pharm Res Pract.* 2023;77-85. <https://doi.org/10.2147/IPRP.S406219>
- [16]. Hua X, Gu M, Zeng F, Hu H, Zhou T, Zhang Y, et al. Pharmacy administration and pharmaceutical care practice in a module hospital during the COVID-19 epidemic. *J Am*
- [17]. Huda RK, Chowhan RS, Seervi D. Effectiveness of mobile health technology-enabled interventions to improve management and control of hypertension and diabetes in India—a systematic review. *Prev Med Rep.* 2025;103094. <https://doi.org/10.1016/j.pmedr.2025.103094>
- [18]. Ibrahim OM, Ibrahim RM, Z Al Meslamani A, Al Mazrouei N. Role of telepharmacy in pharmacist counselling to coronavirus disease 2019 patients and medication dispensing errors. *J telemed telecare.* 2023;29(1):18-27. <https://doi.org/10.1177/1357633X20964347>
- [19]. International Pharmaceutical Federation (FIP). Telepharmacy: Global survey and guidelines for implementation. The Hague: FIP; 2021 [cited 2026 Apr 21]. Available from: <https://www.fip.org/file/5092>
- [20]. International Pharmaceutical Federation (FIP). Telepharmacy: Global survey and guidelines for implementation. The Hague: FIP; 2021 [cited 2026 Apr 21]. Available from: <https://www.fip.org/file/5092>
- [21]. International Pharmaceutical Federation (FIP). Telepharmacy: Global survey and

- guidelines for implementation. The Hague: FIP; 2021 [cited 2026 Apr 21]. Available from: <https://www.fip.org/file/5092>
- [22]. Kилоva, K. (2020). Telepharmacy-new opportunities for pharmacists and patients (overview). KNOWLEDGE-International Journal, 40(5), 855-861.
- [23]. Kruse, C. S., Krowski, N., Rodriguez, B., Tran, L., Vela, J., & Brooks, M. (2017). Telehealth and patient satisfaction: a systematic review and narrative analysis. *BMJ open*, 7(8), e016242.
- [24]. Leo, D. G., Buckley, B. J., Chowdhury, M., Harrison, S. L., Isanejad, M., Lip, G. Y., ... & TAILOR investigators. (2022). Interactive remote patient monitoring devices for managing chronic health conditions: systematic review and meta-analysis. *Journal of Medical Internet Research*, 24(11), e35508.
- [25]. Le T, Toscani M, Colaizzi J. Telepharmacy: A new paradigm for our profession. *J Pharm Pract*. 2020;33(2):176-84. doi:10.1177/0897190018791063
- [26]. Le, T., Toscani, M., & Colaizzi, J. (2020). Telepharmacy: a new paradigm for our profession. *Journal of pharmacy practice*, 33(2), 176-182.
- [27]. Li H, Zheng S, Liu F, Liu W, Zhao R. Fighting against COVID-19: innovative strategies for clinical pharmacists. *Res Soc Admin Pharm*. 2021;17(1):1813-8. doi: 10.1016/j.sapharm.2020.04.003. [DOI] [PMC free article] [PubMed] [Google Scholar]
- [28]. Lobo Borba HH, Woronowicz Carvalho DM. Impact of the Fourth Industrial Revolution on clinical pharmaceutical services: A scoping review. *Res Social Adm Pharm*. 2023;19(2):235-42. doi:10.1016/j.sapharm.2022.09.008.
- [29]. Ministry of Health and Family Welfare, Government of India. Telemedicine Practice Guidelines. New Delhi: MoHFW; 2020 Mar 25 [cited 2026 Apr 21]. Available from: <https://www.mohfw.gov.in/pdf/Telemedicine.pdf>
- [30]. Ministry of Health and Family Welfare, Government of India. Telemedicine Practice Guidelines. New Delhi: MoHFW; 2020 Mar 25 [cited 2026 Apr 21]. Available from: <https://www.mohfw.gov.in/pdf/Telemedicine.pdf>
- [31]. National Health Mission. Ayushman Bharat Digital Mission. New Delhi: NHA; 2024 [cited 2026 Apr 21]. Available from: <https://abdm.gov.in/>
- [32]. National Family Health Survey (NFHS-5), India, 2019-21. Mumbai: IIPS; 2022 [cited 2026 Apr 21]. Available from: <http://rchiips.org/nfhs/>
- [33]. National Health Mission. Ayushman Bharat Digital Mission. New Delhi: NHA; 2024 [cited 2026 Apr 21]. Available from: <https://abdm.gov.in>
- [34]. Pathak S, Blanchard CM, Moreton E, Urlick BY. A Systematic Review of the Effect of Telepharmacy Services in the Community Pharmacy Setting on Care Quality and Patient Safety. *J Health Care Poor Underserved*. 2021;32(2):737-50. doi: 10.1353/hpu.2021.0102.
- [35]. Pharmacy Council of India. Pharmacy Practice Regulations, 2015. New Delhi: PCI; 2015 Jan 16 [cited 2026 Apr 21]. Available from:
- [36]. Poudel A, Nissen LM. Telepharmacy: a pharmacist's perspective on the clinical benefits and challenges. *Integr Pharm Res Pract*. 2016;75-82. <https://doi.org/10.2147/IPRP.S101685>
- [37]. Poudel A., Nissen L. Telepharmacy: Clinical benefits and challenges, 2016. PMC
- [38]. Rambabu, P, Sunitha P, Bhavya Sri TL, Neha Sri T, Sujana K. Telepharmacy and Digital Health Integration. *Int J Pharm BioMed Sci*. 2025; 5(5), 290-297. <https://doi.org/10.47191/ijpbms/v5-i5-01>
- [39]. Saeed H, Scahill S, Kim J, Moyaen R, Natarajan D, Soga A et al. Pharmacist Perceptions and Future Scope of Telepharmacy in New Zealand: A Qualitative Exploration. *Int J Telemed Appl*. 2024;2024(1):2667732. <https://doi.org/10.1155/2024/2667732>
- [40]. Saeed H, Scahill S, Kim J, Moyaen R, Natarajan D, Soga A et al. Pharmacist Perceptions and Future Scope of Telepharmacy in New Zealand: A Qualitative Exploration. *Int J Telemed Appl*. 2024;2024(1):2667732. <https://doi.org/10.1155/2024/2667732>
- [41]. Sarasmita MA, Sudarma IW, Jaya MKA, Irham LM, Susanty S. Telepharmacy Implementation to Support Pharmaceutical Care Services during the COVID-19 Pandemic: A Scoping Review. *Can J Hosp Pharm*. 2024;77(1):e3430. <https://doi.org/10.4212/cjhp.3430>

- [42]. Toussaint-Schoenmakers R, Versluis A, Chavannes N, Talboom-Kamp E, Kasteleyn M. The challenge of integrating eHealth into health care: systematic literature review of the Donabedian model of structure, process, and outcome. *J Med Internet Res*. 2021 May 10;23(5):e27180.
- [43]. Unni EJ, Patel K, Beazer IR, Hung M. Telepharmacy during COVID-19: A Scoping Review. *Pharmacy (Basel)*. 2021;9(4):183. doi: 10.3390/pharmacy9040183.
- [44]. Vo AT, Gustafson DL. Telepharmacy in oncology care: a scoping review. *J Telemed Telecare*. 2023;29(3):165–76. doi: 10.1177/1357633X20975257. [DOI] [PubMed] [Google Scholar]
- [45]. Vo AT, Gustafson DL. Telepharmacy in oncology care: a scoping review. *J Telemed Tele care*. 2023;29(3):165–76. doi: 10.1177/1357633X20975257. [DOI] [PubMed] [Google Scholar]
- [46]. Watson KE, Singleton JA, Tippett V, Nissen LM. Defining pharmacists' roles in disasters: a Delphi study. *PLoS One*. 2019;14(12):e0227132. doi:10.1371/journal.pone.0227132. [DOI] [PMC free article] [PubMed] [Google Scholar]
- [47]. World Health Organization. Monitoring the implementation of digital health: an overview of selected national and international methodologies [Internet]. 2022 [cited 2024 Feb 25]. Available from: <https://www.who.int/europe/publications/i/item/WHO-EURO-2022-5985-45750-65816>.
- [48]. World Health Organization. Global strategy on digital health 2020-2025. Geneva: WHO; 2021 [cited 2026 Apr 21]. Available from: <https://www.who.int/docs/default-source/documents/gS4dhdaa2a9f352b0445bafbc79ca799dce4d.pdf>
- [49]. Wong ZS, Rigby M. Identifying and addressing digital health risks associated with emergency pandemic response: Problem identification, scoping review, and directions toward evidence-based evaluation. *Int J Med Inform*. 2022;157:104639. doi: 10.1016/j.ijmedinf.2021.104639.
- [50]. Ministry of Health and Family Welfare, Government of India. Telemedicine Practice Guidelines. New Delhi: MoHFW; 2020 Mar 25 [cited 2026 Apr 21]. Available from: <https://www.mohfw.gov.in/pdf/Telemedicine.pdf>
- [51]. World Health Organization. Global strategy on digital health 2020-2025. Geneva: WHO; 2021 [cited 2026 Apr 21]. Available from: <https://www.who.int/docs/default-source/documents/gS4dhdaa2a9f352b0445bafbc79ca799dce4d.pdf>
- [52]. Win AZ. Telepharmacy: Time to pick up the line. *Res Social Adm Pharm*. 2017;13(4):882-3. DOI: 10.1016/j.sapharm.2015.06.002
- [53]. World Health Organization. WHO Global Report on Traditional and Complementary Medicine 2019. Geneva: WHO; 2019. Licence: CC BY-NC-SA 3.0 IGO.
- [54]. Xu H, Huang S, Qiu C, Liu S, Deng J, Jiao B, et al. Monitoring and management of home-quarantined patients with COVID-19 using a WeChat-based telemedicine system: retrospective cohort study. *J Med Internet Res*. 2020;22(7):e19514. doi: 10.2196/19514. [DOI] [PMC free article] [PubMed] [Google Scholar]